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NATURAL RESOURCES PROGRAM

of the

Town of Wilmington, Massachusetts

PHASE I STUDY

Inventory and Evaluation of Sites
with
Natural Resource Potentials

Prepared by the

Natural Resources Technical Team

of

Middlesex County

In Cooperation with the

Middlesex Conservation District

January 1971

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I. ACKNOWLEDGMENTS

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II. SUMMARY

The Natural Resources Technical Team has developed this inventory and evaluation in cooperation with the Recreation Commission and the Conservation Commission.

Wilmington is a residential town 16 miles from the City of Boston. It has grown rapidly in the past 20 years, experiencing an annual growth rate of 450 people.

The immediate and long range problems that face the town are the protection of its water supply from potential sources of pollution, the preservation of flood plains, and the lack of public land to meet the needs of a growing population.

The Technical Team and the Recreation and Conservation Commission feel that greater development and utilization should be made of some of the lands already in public ownership, such as school play areas and Water Department lands.

The potentials of many privately owned parcels are also listed and should be considered in the development of Wilmington's Natural Resources Plan.

III. INTRODUCTION AND SCOPE OF STUDY

This report is based on information taken from map studies, field investigations, and data provided by various local agencies. A review of previously published studies and reports was also made.

The Natural Resources Program provides basic information to assist the community in planning for the wise use and development of its open space and other natural resources.

This report is the initial phase of the program and is designed to fulfill the following:

1) Identify existing publicly owned open space.
2) Identify areas, public and private, which have a potential value if developed for recreation.
3) Identify existing and potential resource needs and problems.
4) Relate in general the community's status in natural resource management and environmental quality.
5) Interpret the data herein and evaluate it for the best possible development and management plan of the town's natural resources.

The scope and limitations of the study were established in consultation with the local advisory group, the Middlesex Conservation District and members of the technical team.

Selected sites are described in terms of physical features and possible uses. No attempt is made to describe details for development and management as this information is made available upon request in later phases of the program.

Present property ownership was not a prerequisite in making evaluations. Experience has shown that property ownerships are subject to change all too frequently to be taken into account in an investigation of this type.

The Town of Wilmington requested that emphasis be put on areas that would facilitate the following potential uses:

Boating Access
Boating
Camping
Playgrounds
Trails
Fishing
Greenbelts
Hunting
Skating
Beautification
Winter Sports
Field Sports
Nature Study
Historical Areas
Picnicking
Swimming
Town Forest
Vista
Wildlife

The limitations of the study are based on a set of minimum criteria for the intended use. See Appendix B.

IV. LOCAL NATURAL RESOURCE NEEDS AND PROBLEMS

The Conservation Commission and Recreation Commission have expressed their views on Wilmington's Natural Resource needs and problems. They are as follows:

1) The need for Flood Plain Zoning.
2) The need for a Sanitary Sewerage System.
3) The rehabilitation of abandoned gravel pits.
4) The maximum use of existing school facilities for organized and spontaneous recreation activities.
5) The development of a system of neighborhood, or mini-parks. These small areas would be located in areas not convenient to a school site, and for primarily non-organized leisure activities. Such areas might comprise picnic facilities, play equipment, and a softball backstop, suitable for family and/or neighborhood gatherings.
6) The increased utilization and development of existing properties under the Recreation Commission's control:

    a. Veterans Memorial Park - To increase passive activities such as nature trails and picnic facilities, along with development of skating areas to complement the skiing, sliding, and ballfield areas.

    b. Town Common - To beautify the Common by planting trees and shrubs, and to erect benches for relaxation.

    c. Town Beach and Silver Lake - To extend the swimming area and provide for non-motorized boating and fishing. To acquire the shoreline of the lake for maintenance of water quality and access.

7) The use of other public lands now controlled by other departments and/or commissions for leisure activites which could be supported on such land without damage to the already existing agencies' purposes.
8) The acquisition of land for either passive or active recreation, the acquisition of multiple use greenbelt areas throughout the community for such activities as skating, boating, golf, archery, and fishing.

V. BASIC STATISTICS

A. Location

Wilmington is located in the Northeastern portion of Middlesex County, Massachusetts. It is bordered on the north by Andover, on the east by North Reading and Reading, on the south by Woburn and on the west by Burlington, Billerica, and Tewksbury. It is 16 miles north of Boston, within an expanding metropolitan area.

B. Area of the Town

The land area of the Town of Wilmington covers 17.12 square miles or 10,957 acres.

C. Population

The five year population figures for the Town of Wilmington are listed below:

		People/Ac
1950	7,039	.64
1955	9,408	.86
1960	12,475	1.14
1965	15,251	1.39
1970	17,011	1.55

These figures indicate a rapid growth rate averaging 450 people per year increase for the past 20 years. The population is expected to peak at 25,000 people in 1980* which would provide a density of 2.3 people/ac.

D. Major Highways and Modes of Transportation

The major highways serving Wilmington are Interstate Route 93 and Massachusetts Route 38 running north and south, Massachusetts Route 62 running northeast and southwest, Massachusetts Route 129 running northwest and southeast, and Massachusetts Route 125 running generally north and south. The Boston and Maine Railroad provides passenger and freight service from two major trunk lines extending into the town. Bus and taxi service is also available. It is obvious that the well-developed transportation system has contributed to the industrial and residential growth of Wilmington.

E. Soils

A soil survey has been completed for Wilmington. It provides detailed

*Wilmington Planning Board

information about soils and their use for the entire town. The report is titled, "Soils and Their Interpretations for Various Land Uses", Town of Wilmington, Middlesex County, Massachusetts, March 1969. Copies of the report are available for use at the Wilmington Conservation Commission office.

In this report, the soils will be discussed in general terms to point out potentials and the limiting factors that may have an effect on the town's growth and state of well being. The Soil Survey report shows five general soil areas. They are:

1) Canton-Windsor Association:

These are deep, well-drained stony soils formed in sandy glacial till and droughty sandy soils formed in thick deposits of sand. This general soil area lies mostly in the Northeastern part of Wilmington and occupies about 11 percent of the town.

2) Hollis Association

These are shallow to bedrock soils. They are ledgy and very stony. Some of these soils are on steep slopes. This general soil area occupies about 9 percent of the town and is scattered throughout the town.

3) Muck-Scarboro-Au Gres Association

These are poorly-drained and very poorly-drained soils in the level and low lying parts of town. This general soil area occupies about 26 percent of the town.

4) Deerfield-Hinckley-Windsor Association

These are moderately well-drained and droughty sandy and gravelly soils. This general soil area occupies about 36 percent of the town.

5) Millis-Woodbridge Association

These soils are well drained and moderately well drained very stony soils developed in loamy, compact glacial till.

This general soil area occupies 18 percent of the town. Most of the soils in the Hollis, Muck-Scarboro-Au Gres and the Millis-Woodbridge Associations that represent 53% of the town have severe limitations for high density residential use where sewage disposal is dependent on septic tank systems. The limitations are due to shallow bedrock, high water table, or a compact

layer (hard pan) beneath the surface. It can be expected that intensive development of most of these soil areas will require large capital outlays for sewers and associated treatment plants.

F. Topography

Wilmington varies from 75 to 250 feet above sea level. The general topographic pattern is hilly north of Interstate 93 and fairly flat in the remaining area. The large area of swamps and marshes at the lower elevations contribute surface runoff to the Ipswich River and Shawsheen River.

G. Vegetation

Most of the undeveloped land is in woodland. Red maples growing in swamps have precluded their use by migratory waterfowl. Most of the woodland is of low commercial value. Its main value is to stabilize soil and slow the rate of snow melt and water runoff.

H. Water

There are about 72 acres of water surface in the town. The largest bodies of water are Silver Lake and the cranberry irrigation ponds on Lubber Brook. The remaining pond acreage consists of small bodies of water scattered throughout the town. The only body of water that is significant for recreational use is Silver Lake. There are 2,200 acres of fresh water marsh and muck soils which have water on the surface for a part of the year. These provide surface water storage during periods of high runoff which reduces peak flood flows in downstream areas.

I. Watershed Basins

The entire eastern portion of the town is in the Ipswich River drainage basin. The basin consists of numerous brooks and marshes which flow in a northeasterly direction to the river itself. There are about 2,200 acres of fresh water marsh and swamps in Wilmington that make up the headwaters of the Ipswich River. These areas store large amounts of fresh water which may have some affect on the quantity and quality of water drawn from nearby municipal well fields. These areas should be protected from encroachment and from contamination by pollutants. At present, studies are being conducted by the U.S. Army Corps of Engineers to identify flood prone areas in the Ipswich River basin. The Massachusetts Water Resources Commission cooperating with other State and Federal agencies has prepared a report on The Public Water Supply Resources of the Ipswich River, January 1965. While the reports pertain to the entire drainage basin, it is

felt that the conclusions drawn and recommendations made will alert Wilmington to problems and needs that will be faced in the future.

J. Wildlife

Migratory waterfowl make use of the open marshes in Wilmington mostly along the Ipswich River. The Conservation Commission has been managing some of the marshes by erecting wood duck nesting boxes on selected sites. Competing woody vegetation is reducing waterfowl habitat quality. Upland game consists mainly of small mammals, pheasants and partridge, in addition to song birds.

K. Agriculture

At one time, Wilmington was an agricultural community specializing in the growing of cranberries and apples. The Baldwin apple was developed here. There are only two active cranberry bogs, a pig farm, and a few poultry farms remaining. Agriculture is not presently a significant economic factor in the growth of the town.

L. Land Use and Development Controls

The Town of Wilmington adopted its zoning bylaw in 1955. The Bylaw has been amended at various town meetings since that time. At present, the Bylaw divides the town into six districts: three residential districts, two business districts, and one industrial district. The Bylaw also includes an ordinance governing the excavation or filling of areas with soil, loam, sand, or gravel. There are no flood plain zoning regulations in Wilmington. The U.S. Army Corps of Engineers has completed its study of flood prone areas of the Shawsheen River, and they are presently conducting a study on the Ipswich River basin. These areas are not considered suitable for development and therefore should be zoned as flood plains.

M. Water

The Town of Wilmington derives all of its water from ground water sources in the Ipswich River basin. The distribution system carries it to all sections of town. According to the town, there is an adquate water supply to meet present and future needs. This appears to be one of Wilmington's greatest natural resources.

N. Sanitary Facilities

There is no sewerage in Wilmington. The entire town is dependent upon on-site septic systems. Many of the soil areas (53 percent) in Wilmington

have severe limitations for this use. While Wilmington's water supply is from ground water sources, it should be noted that septic systems in sandy areas could have an adverse affect on the ground water supply.

O. Public and Semi-Public Land

There are 688 acres of land in public ownership in Wilmington. The Water Department administers 460 acres of this land, the School Department 89 acres, Conservation Commission 86 acres, and the Town Forest and Park 44 acres. The Park and Recreation Commission adminsters the beach at Silver Lake and the play fields at the town forest. This amounts to approximately 3.5 acres of beach and four acres of playing field. Outside of school playgrounds there are less than 10 acres of playground, playfield or park area. It is obvious that this is below the minimum standards set by the National Recreation Association. There are approximately 103 acres of semi-public land in town. The most significant of these is the Wilmington Jr. Camp and the Garden of Eden Country Club which is a nine-hole golf course. There are no state or federal parks or forests in the town of Wilmington.

VI. ANALYSIS OF BASIC DATA

It is apparent from the data presented that Wilmington is undergoing rapid development. Its close proximity to Metropolitan Boston and its access to major transportation arteries suggests continued growth. While the town has about 5 1/2 percent of its land in public ownership, most of this is administered by the water department to protect its well-field from contamination. The need and demand for land for open space and recreational use has exceeded that provided. A joint program of land acquisition should be instituted to satisfy specific needs.

A plan should be initiated to develop existing town properties for passive types of recreation. This might include the development of a park system utilizing rehabilitated gravel pits and tax title land for activities such as hiking, picnicking or bird watching.

New areas might be added by taking advantage of various state and federal programs which provide financial assistance for acquisition and development.

VII. INVENTORY DATA

The town has been geographically divided into three sections to facilitate preparing the narrative description of the resource complexes. (See Natural

Resources Map Appendix). Routes 93 and 38 were used to form the boundaries of the resource sections. Within each Resource Section, resource complexes have been identified. The Resource Complex numbers correspond to the numbers on the map in the narrative of the Inventory Data.

The discussion and map legend used in this report are as follows:

A. Boating Access
B. Boating
C. Camping
D. Playgrounds
E. Trails
F. Fishing
G. Greenbelts
H. Hunting
I. Ice Skating
K. Winter Sports
L. Field Sports
N. Nature Study
O. Historical
P. Picnicking
S. Swimming
T. Town Forest
V. Vista
W. Wildlife Impoundment Sites

RESOURCE SECTION I

Resource Complex	Potential	
1		Fosters Pond
		For the most part, Fosters Pond lies within the boundaries of the town of Andover, however, there is a small cove on the west side of the pond that extends into Wilmington. There is no public access to the pond. The entire shoreline is privately owned.
	A	Boat Access - Acquire land, construct boat ramps and parking facilities.
	B	Boating - Access would make entire lake usable.
	F	Fishing - With public access, the Massachusetts Divison of Fish and Game would provide management assistance.
	W	Wildlife - Nesting and migratory waterfowl utilize the extensive marshy areas surrounding this pond.

Resource Complex	Potential	
2		Camp Forty Acres (Wilmington Junior Camp). This is a quasi-public camping area which is used by organized groups. The area is accessible from Woburn Street.
	C	Camping - Existing facilities include shelters and tent sites as well as cooking and sanitary facilities. There are also roads and parking facilities.
	E	Trails - Existing trails are used for hiking, nature study and horseback riding.
	G	Greenbelt - This area in its present state serves as a greenbelt providing access to much undeveloped land in the northern part of Wilmington.
	K	Winter Sports - Existing trails may be used for cross country skiing.
	L	Field Sports - The two acre field near the entrance off Woburn Street could serve as a field sports area. Needs grading and seeding.
	N	Nature Study - The existing trails and walkways are adequate to provide interesting nature walks.
	P	Picnicking - There is a potential for day use and limited picnicking without interfering with the camp operation. Needed are picnic tables.
	T	Town Forest - Portions of the area are being managed silviculturally for the improvement of the timber stand. Some areas have been reforested.
	W	Wildlife - Wildlife consists of song birds and small mammals. The habitat may be improved by special wildlife shrub plantings.
3		Land adjacent to Camp Forty Acres. This land abuts Camp Forty Acres to the south and lies west of Woburn Street. This area has the highest elevation in town, being 255 feet above sea level. The vegetation consists of mixed hardwoods with oak predominating.

Resource Complex	Potential	
	C	Camping - Organized camping can be established with the installation of sanitary facilities and the sites laid out.
	E	Trails - Some trails exist for hiking and horseback riding. The trail system should be expanded to provide access to the entire area for forest fire protection.
	H	Hunting - This area is suitable for hunting upland game in abandoned farm land.
	K	Winter Sports - Trails may be used for cross country skiing and snow shoeing. The northwest slope has a potential for skiing, sledding, and tobogganing. Needs discriminate clearing, grading and seeding.
	N	Nature Study - The nature study program at Camp Forty Acres could be expanded to utilize the trails in both areas.
	P	Picnicking - This area has a potential for picnicking in conjunction with an organized camping program.
	T	Town Forest -This area is a potential Town Forest.
	V	Vista - With a limited amount of clearing, this site would provide excellent views to the east and south.
4		Ballardvale Road Impoundment Site.

A small shallow pond may be created by building a dam on a small unnamed brook on the east side of Ballardvale Road. Refer to Appendix F Impoundment Site #1. The land is privately owned.

	I	Ice Skating - Clear off brush and trees and construct dam.
	W	Wildlife - The body of water created would provide habitat for nesting and migratory waterfowl as well as a watering hole for upland game species

Resource Complex	Potential	
5		Water Department Lands
		These two parcels of land are located on the north and south side of Route 125 at the North Reading town line. These are town owned lands that are managed by the Water Department.
	E	Trails - The existing trail system may be expanded for hiking and horseback riding.
	T	Town Forest - These parcels also have a potential for use as town forest for the production of timber.
6		Hathaway Acres
		This is an abandoned housing development and gravel pit off Salem Street near the North Reading town line. The land is being managed by the Conservation Commission. The Commission has reshaped the area and is currently developing a planting and management plan with the assistance of the Massachusetts Department of Natural Resources and the Middlesex Conservation District. The land abuts Water Department land and Martins Brook.
	A	Boat Access - This parcel provides access to Martins Brook and the Lagoon. Needs parking area to accommodate 15 cars.
	B	Boating - For canoe and car top boats on Martins Brook and the lagoon.
	E	Trails - Develop trail systems for other uses such as hiking and to provide access for boating, skating and nature study.
	I	Ice Skating - The lagoon is presently used for neighborhood skating.
	N	Nature Study - The marsh and lagoon have a potential as a nature study area.
	W	Wildlife - Nesting and migratory waterfowl use this area.

Resource Complex	Potential	
7		Water Department Land

This land is located at the North Reading town line, south of Salem Street. The area abuts an old abandoned railroad bed and resource complex 6. This is an abandoned gravel pit and several ponds have been made as a result of the gravel operations. Refer to Appendix E - Operation and restoration standard for gravel pits.

E	Trails - An expanded trail system may be developed to tie into resource complexes 6 and 8. They may be used for hiking and horseback riding. They may also be used for access to the ponds.
F	Fishing - The water quality of the ponds on this site is excellent and supports warm water fisheries.
N	Nature Study - Area may be enhanced by plantings.
U	Beautification - The area in its present state is in need of a planting program for the stabilization of the soil and also for beautification.
W	Wildlife - The area has a potential for wildlife management for nesting and migratory waterfowl.

8 Water Department Lands and the Old Railroad Bed

These are three separate parcels of town-owned land which are managed by the Water Department. They are located in the northeastern portion of the town between Salem Street and Route 125. The Old Railroad Bed forms the southern boundary of the three separate parcels and acts as a dike at the Browns Crossing Pumping Station. These holdings may be expanded into a continuous Greenbelt extending from Route 125 to the North Reading line by acquiring the uplands to the west of Woburn Street.

E	Trails - Utilize the Old Railroad Bed and develop interior trails for hiking and horseback riding.

Resource Complex	Potential	
	F	Fishing - The pond on one of these parcels supports a warm water fisheries. With public access to the pond, the Massachusetts Division of Fish and Game would provide management assistance.
	I	Ice Skating - These ponds in their present state have a potential for ice skating.
	N	Nature Study - These areas have a potential for nature study. Trails may be laid out to provide access to wetland and upland habitats for study. Water management as it pertains to public water supply may also be studied.
	W	Wildlife - The wetlands are managed to a limited extent for nesting and migratory waterfowl.
		Resource Section II
9		Wilmington Junction Sanctuary
		This is an extensive marsh to the south of Wilmington Junction. The Boston and Maine Railroad bisects the sanctuary and runs north and south. The old abandoned railroad bed is at the north end of the sanctuary running east and west. Route 93 is the northern boundary of this marsh.
	H	Hunting - With some clearing and management this area would be suitable for hunting.
	N	Nature Study - The marsh is suited to nature study utilizing the old railroad bed for access.
	W	Wildlife - Opportunities exist for wildlife habitat improvement, controlling vegetation, setting out food plants, developing open water areas and providing nesting opportunities.
10		Wilmington Intermediate School
		Located on Salem Street
	L	Field Sports Area - Existing. Has facilities for baseball, soccer and tennis.

Resource Complex	Potential	
11		Glen Road School - Located on Glen Road, this is an elementary school.
	L	Field Sports - There is a small field sports area and play field located on the school property. Improved turf management is needed.
	N	Nature Study - There is a potential for developing an outdoor classroom in the small marshy area to the west of the school. There is also a potential for expanding the outdoor classroom into the Lubbers Brook Marsh to the north.
12		Whitfield School
		Located on Middlesex Avenue, this structure is one of the older elementary schools in town.
	D	Playground - A small playground is located on the school grounds.
	I	Ice Skating - Construct dugout pond in marsh to the west of the school.
	N	Nature Study -This is a potential for an outdoor classroom to the west of the school property in the marsh which is part of the Lubber Brook drainage system. A trail system can be developed and a dugout pond can be excavated. The pond can also be utilized for ice skating.
13		Wilmington High School
		Located on Middlesex Avenue in the Wilmington Senior High School.
	I	Ice Skating (see Nature Study)
	L	Field Sport - Playing fields and tennis courts are located on the grounds.
	N	Nature Study - There is a potential to develop a pond for nature study and ice skating to the east of the playing fields.
14		Walker Elementary School
		Located on Adelarde Street, this structure is one of the older school buildings in town. Lions Park is located across the street

Resource Complex	Potential	
		from the school.
	D	Playground The school playground is located on the school property.
	G	Greenbelt - Serves as a greenbelt in its present state.
	I	Ice Skating - The pond in Lions Park is presently used for ice skating.
	L	Field Sports - There exists in Lions Park a little league ball field. There is also an area for informal field sports.
	N	Nature Study - The pond in Lions Park may be utilized as a nature study area for use by the students of Walker School.
	U	Beautification - There exists in the park a potential for conservation in the form of plantings for beautification and for use by the students in their course of outdoor study.
15		Wildwood School and Conservation Land The Wildwood School is located on Wildwood Street with an access from Federal Street. The Conservation Commission lands are located on the south side of Wildwood Street, abutting Maple Meadow Brook.
	D	Playground - A playground exists on the school ground.
	I	Ice Skating -There is a potential for developing a skating pond in Maple Meadow swamp.
	L	Field Sport - A field for informal games exists on the school grounds.
	N	Nature Study - Maple Meadow swamp has a potential for the development of an outdoor classroom for the study of ecology. There is also a potential for the construction of dugout ponds to be used in conjunction with the outdoor classroom. The excavated material from the pond may be used to construct trails and to support vegetation planting for use in the course of study.
	W	Wildlife - There is an opportunity to practice wildlife management in the meadow by creating clearings for wildlife plantings

Resource Complex	Potential	
		and developing open water areas for various species of birds and mammals.
16		Maple Meadow Conservation Land - This is town-owned land located on the north side of Federal Street and Maple Meadow Brook. The land is administered by the Conservation Commission. This is wetland. A dugout pond may be constructed on this site.
	F	Fishing - Maple Meadow Brook is not stocked but does have a population of native trout. A dugout pond may be constructed adjacent to the brook and managed for fishing.
	I	Ice Skating - A dugout pond may be constructed on this site for ice skating and fishing.
	W	Wildlife - The brook is used by migratory waterfowl. More intensive wildlife management may include the installation of wood duck nesting boxes.
17		Hundred Acre Meadow (Ipswich River)
		This area is on the west side of Route 93, east of the Boston and Maine Railroad and south of Concord Street. Access to this area is off Kilmarnock Road. This area is in the Flood Plain of the Ipswich River.
	A	Boat Access - Access may be developed off West Street. Parking facilities needed.
	B	Boating - Boating on the Ipswich River is limited to small car top boats and canoes.
	F	Fishing - The Ipswich River is managed by the Massachusetts Division of Fish and Game for trout fishing.
	I	Ice Skating - Dugout ponds within the marshes of the Ipswich River may be developed for ice skating.
	W	Wildlife - The Wilmington Conservation Commission maintains wood duck nesting boxes in these marshes which are privately owned.

Resource Complex	Potential	
18		Foley's Field
		This field is located on the east side of West Street, west of the Boston and Maine Railroad. A tributary of the Ipswich River passes through the property. This land is privately owned.
	C	Camping - Camping may be established with the installation of sanitary facilities.
	D	Playground - The field may be developed into a playground with a minimum of grading.
	E	Trails - Trails may be established to link camp sites and provide access for fire protection.
	L	Field Sports - Playing fields for sports may be developed with a minimum of site preparation.
19		Avco Athletic Association
		This facility is operated by the Avco Employees Association for their own use.
	F	Fishing - A dugout pond has been built on this site. The pond is stocked.
	I	Ice Skating - The pond is used for ice skating during the winter months.
	L	Field Sports - Tennis court, baseball and softball diamonds have been installed for use by employees.
20		Volcanic Hill
		This hill is located on the west side of Route 38 bordering the Woburn City line. The vegetation is scrubby due to the shallow to bedrock soils.
	V	Vista - An unnamed street and power line provide access to the summit. With clearing, vista would provide views in all directions.

Resource Complex	Potential	
21		The Shawsheen River
		The Shawsheen River in Wilmington is the western boundary of the town. The town owns two small parcels of land which abut the river. Every effort should be made by the community to protect the flood plain of the east bank from encroachment.
	A	Boat Access - Access to the river is provided by the two parcels of land managed by the Conservation Commission. Sites need parking facilities and launching facilities.
	B	Boating - Boating on the Shawsheen River is limited to car top boats and canoes.
	F	Fishing - The Shawsheen River is managed by the Massachusetts Division of Fish and Game for trout fishing.
	O	Historical Site - Aqueduct on Middlesex Canal.
	W	Wildlife - Various species of nesting and migratory waterfowl utilize the marshes and open water.
22		Shawsheen School
		The Shawsheen School has just been completed. It is located at the intersection of Shawsheen Street and Hopkins Street.
	I	Ice Skating - See Nature Study
	L	Field Sports - A large playing field has been constructed on the site.
	N	Nature Study - A nature study center can be developed to the west of the school. The center could include a pond and wildlife plantings.
	W	Wildlife - Food and cover plantings.
23		Lubber Brook
		This area extends from the Billerica town line northeasterly to the Old Middlesex Canal. Route 129 passes through the area separating a cranberry bog from two irrigation ponds on the westerly side of Route 129. The land is privately owned.

Resource Complex	Potential	
	C	Camping - There is a potential for camping in a stand of white pines on the south side of Lubbers Brook. Needed are campsite trails and sanitary facilities. Only a minimum of clearing would be required.
	E	Trails - Trails and access roads exist - should be expanded for other uses such as camping, nature study and fire protection.
	F	Fishing - The irrigation ponds provide excellent warm water fishing. The ponds should be deepened in certain areas to offset the water level fluctuations caused by using the water for flooding the cranberry bogs.
	G	Greenbelt - This area in its present state serves as a greenbelt and should be protected to prevent future encroachment of expanding developments.
	I	Ice Skating - The ponds are presently used for ice skating.
	N	Nature Study - The entire area has an excellent potential for nature study providing a wide spectrum of ecosystems.
	W	Wildlife - In its present state the area is a good wildlife area offering a variety of habitats. With management practices such as food patches, wood duck nesting boxes at the area would be outstanding.
24		Water Department Lands - Lubbers Brook These are town-owned lands which are managed by the Water Department. Access to this land is from Aldrich Street and it extends to Lubber Brook.
	G	Greenbelt - Provides access to Lubber Brook.
25		Silver Lake This pond has a water surface of 38 acres and is located at the westerly side of town adjacent to Route 38. The town beach and facilities are managed by the Recreation Commission and occupy 3 1/2 acres on the west side of the pond. There is also a privately owned public beach on the south side of the pond.

Resource Complex	Potential	
		Since this is the only recreation water in the town, the shore line should be acquired for the protection of the facility. In addition intense control of sewage disposal systems in the drainage area must be taken to avoid contamination.
	A	Boat Access - Access to the water for boats exists.
	B	Boating - Because of the limited size of the lake and the numbers of swimmers using the lake, boating should be limited to non-powered boats and canoes.
	F	Fishing - The pond is presently managed as a warm water fisheries.
	I	Ice Skating - The Recreation Commission manages a skating program for the town.
	P	Picnicking - There is a potential for picnicking at the town beach - additional picnic tables are needed.
	S	Swimming - Existing beach and facilities may be expanded.
26		Boutwell Street School
		Located off Boutwell Street the school is one of the newer elementary schools in the town.
	D	Playground - A playground is located on the grounds.
	I	Ice Skating -Dugout pond at north side.
	L	Field Sports - There is a small field sports area for informal games located at the school.
	N	Nature Study - The woodland and small marsh located at the north end of the site has a potential for an outdoor classroom for both schools. A dugout pond may be constructed for the nature center and for ice skating.
27		Garden of Eden Area
		The Garden of Eden area extends from the Woburn town line and along the Burlington town line to the Ipswich River. Chestnut Street forms the eastern boundary. The vegetation consists of

Resource Complex	Potential	
		mixed hardwoods, predominantly oak, with a few stands of white pine scattered throughout. Mill Brook flows in an easterly direction to the confluence of Maple Meadow Brook. The land is privately owned and abuts the Garden of Eden Country Club. Impoundment Site 2 is located on Mill Brook. Refer to Appendix F.
	E	Trails - The area is suitable for hiking and horseback riding. There are trails existing but the system should be expanded and improved.
	F	Fishing - Mill Brook has a potential for fishing. Although the brook is not stocked, there is a population of native trout.
	I	Ice Skating - A dugout pond may be constructed for skating. The impoundment, if developed, may also be used for skating.
	K	Winter Sports - The pipeline may be utilized as a winter sports area. The area may be expanded by developing slopes on either side of the pipeline. The north slope of the hill south of Mill Brook has a potential for winter sports.
	L	Field Sports - The golf course adjacent to this area will support field sports activities.
	O	Historical - There is an old mill site on Mill Street. An in-depth study should be made relative to the historical importance of the site to see if it warrants restoration.
	P	Picnicking - There are many potential picnic sites in the area. Needed are sanitary facilities, access and parking.
	W	Wildlife - The pond, if created, will provide additional wildlife habitat for migratory water fowl and mammals.
28		Chestnut Street Well-fields
		These are town-owned parcels of land which are managed by the Water Department. They abut the Town Forest (30) on the west side. The Middlesex Canal passes through one of these parcels.
	E	Hiking - The Middlesex Canal may be utilized for hiking and

Resource Complex	Potential	
		horseback riding from Butters Row to the town forest through one of these parcels. The trail system may be expanded from the town forest to Chestnut Street.
	L	Field Sports - A field sports area may be developed at the western end of the parcel near Chestnut Street.
	N	Nature Study - The area has a potential as a nature study area adjacent to Maple Meadow Brook. There are many varieties of vegetation to be studied.
	W	Wildlife - The area in its present state supports waterfowl and small mammals.
29		The Town Forest and Park
		The town forest and park is a 44 acre tract of land located in the southern end of town on Route 38. A portion of the Old Middlesex Canal passes through the area. The Town Forest is managed by the Conservation Commission. The Park is managed by the Recreation Commission. A management plan for the Forest and Park has been developed by the Department of Natural Resources.
	E	Trails - A trail system does exist. It needs improvement and could be expanded to provide access to other parts of the forest for hiking, horseback riding and fire protection.
	G	Greenbelt - The area serves as a greenbelt in its present state.
	K	Winter Sports - There is a very short slope with a rope tow which is used for skiing and sledding.
	L	Field Sports - A field sports area exists. It is heavily used and has lighting for night use.
	N	Nature Study - Utilize expanded trail system for nature study in wetlands and marshes. A wildflower and plant garden is maintained in the forest.
	O	Historical - A portion of the Old Middlesex Canal lies within the town forest. The stone work of an old aqueduct serves as a monument to a bygone era. This portion of the canal should be preserved for historical reasons.

Resource Complex	Potential	
	P	Picnicking - There is a potential for picnicking in the forest. Needed are picnic tables and sanitary facilities.
	T	Town Forest - Although called a town forest, the area is not managed for woodland production but for aesthetics.
	U	Beautification - Opportunites exist to develop demonstrations of conservation practices which might include plantings for stabilization, wildlife, and beautification. A wildflower and plant garden is maintained in the forest.
30		Gravel Pits
		This area is composed of several abandoned gravel pits. It is located near Maple Meadow Brook and lies to the east of Chestnut Street. There are several ponds in the area resulting from the gravel operation. The land is privately owned.
	E	Hiking - The existing gravel pit roads may be expanded to provide access to the ponds.
	F	Fishing - The ponds within the gravel pit may be improved by deepening and stocked with warm water species of fish.
	I	Ice Skating - The shallow ponds may be utilized for ice skating. If the water is over 3 - 4 feet deep, new skating ponds can be constructed.
	N	Nature Study - A study in plant succession may be made from the natural re-vegetation taking place in the pit. The ponds may also be used to study pond population.
	P	Picnicking - Following the rehabitation of this area, there is an opportunity to develop a picnic site. Needed are picnic tables and sanitary facilities.
	U	Beautification - Rehabilitation of the area may be accelerated by planting selected tree species and by developing a detailed planting plan. Planting would be for the purpose of stabilizing the soil, beautification and wildlife.
	W	Wildlife - Food and cover wildlife shrub plantings would enhance the wildlife potential of the area.

Resource Complex	Potential	
31		Gravel Pits - This abandoned gravel pit is east of Route 38 at the Woburn city line. The land is owned by the Town of Wilmington.
	G	Greenbelt - Through a planned program of grading and reforestation, the area will serve as a greenbelt.
	L	Field Sports - The area would be suitable for a field sports area providing an intensive land rehabitation program is instituted. The area would also require intensive management to maintain vegetation following development.
	T	Town Forest - To develop a town forest would require cleaning up debris and a reforestation program using adapted species.
	U	Beautification - To develop an intensive land management program to protect Maple Meadow Brook from siltation by establishing vegetative cover in the surrounding watershed area.

VIII. ANALYSIS OF INVENTORY DATA

In analyzing the basic statistics and the inventory data, the Technical Team feels that the town should make a concerted effort to fulfill its natural resource needs. Rapid population growth has diverted energies of town agencies to the planning and implementation of other programs.

In order to utilize fully existing and potential natural resources, an active program must be set up without delay. It is felt that an adequate program will require the wholehearted support of all branches of the town's government. An aggressive information and education program will be needed to create an aware and informed citizenry. The Technical Team has listed some of the areas where action is needed:

A. Wetlands, ponds and streams and rivers

1. The wetlands in Wilmington are a part of the Shawsheen or the Ipswich River watershed. These inland wetlands exert considerable influence on ground water levels, help regulate peak storm flows and reduce flooding, provide habitat for wildlife and generally enhance the character and aesthetics of the community. Priorities for action are:
   a) To acquire or establish conservancy zoning on wetland areas

adjacent to streams flowing into the Ipswich River and the Shawsheen River.

b) Identify flood plains and adopt flood plain zoning. Request technical and financial assistance from the U.S. Army Corps of Engineers and U.S. Department of Housing and Urban Development.

2. Ponds - Silver Lake is the only natural pond of significant size in Wilmington. It is a great pond and does supply some of the recreational needs of the town. The cranberry irrigation ponds on Lubber Brook are also of significant size; however, these are shallow ponds and are used for irrigating the cranberry bogs. Their usefulness is limited to the less intensive activities such as wildlife management and nature study. The pressures exerted on Silver Lake for swimming, boating, and fishing are beyond its present carrying capacity. Priorities to more fully develop the fresh water resources of Wilmington are:

a) Study the feasibility of acquiring the entire shoreline of Silver Lake.

b) Study the feasibility of extending the beach area to meet national recreation standards for the projected population.

c) Establish an area for boat access for non-motorized boats and canoes.

d) Study the feasibility of developing impoundment site #2 to determine its role in meeting the recreational water needs of the future.

3. Streams and Rivers - The headwaters of the Ipswich River drainage area are in Wilmington. The quality of water in these streams and rivers has an effect on water quality in downstream communities. Specific actions to maintain water quality control are as follows:

a) Initiate a study to determine the needs of the town for the installation of sewers and a sewerage treatment plant to service the community.

b) Work with regional and downstream interests to support legislation necessary to study, finance, and construct needed waste treatment facilities within the Ipswich main watershed.

c) Fully inventory, analyze and plan the use of the remaining open area within the Ipswich River watershed.

d) Determine what effect alternative types of development and land use will have on the water quantity and quality of the river.

e) Evaluate the wildlife benefits of the area and how various types of development may take place while still retaining or improving wildlife habitat.

B. Existing Recreational Areas

It has been stated in this report that the existing recreational facilities are not adequate for Wilmington's present and projected population. The town has taken a step in the right direction in hiring a trained recreational supervisor who can devote his full time to planning and implementing a recreation program. With adequate financing and cooperation among town boards and commissions, a fine recreation program can be developed with adequate facilities.

1. Water-based Recreation

a) Expand beach and picnic facilities at Silver Lake.
b) Establish a boat access area at Silver Lake for non-motorized boats and canoes.
c) Investigate the feasibility of developing additional water surface in areas where gravel is being extracted.
d) Construct trails and fishing access points at selected locations on Maple Meadow Brook and the Ipswich River.

2. Land-based Recreation Areas

Present park and recreation areas are limited to the field sports areas at the town forest and park. Cooperation with the school department could result in additional areas for field sports, and playgrounds can be incorporated into the recreation program and provide for the needs of youth in the neighborhoods near the schools. This would provide seven additional activity centers.

These school areas are located on the Natural Resources Map.

Resource Complex	
10	Wilmington Intermediate School
11	Glen Road School
12	Whitfield School
13	Wilmington High School
15	Wildwood School
22	Shawsheen Street School
26	Boutwell Street School

With additional use these playgrounds and field sports areas will require a higher level of management to protect vegetative cover. Some of them will require additional playground equipment. Resource Complex 19 is a privately owned field sports area where arrangements might be made to use the facilities

on a fee basis.

C. Potential Recreational Areas

The acquisition of recreational areas to satisfy the demands of any city or town should be a continuous one. The Technical Team feels that a program of acquisition and development should be reactivated in Wilmington and that areas be acquired for open space and for active and passive recreational uses. Areas which offer multiple purpose activities should take priority.

The following actions are suggested. Acquire by purchase, easement, or gift those land areas having a high value for future development.

Resource Complex

3 - Passive recreation and open space
4 - Passive recreation, wildlife and ice skating
6 - Active and passive, possible swimming and fishing
17 - Flood prone area - wildlife
18 - Field sports area and playground
23 - Passive recreation - wildlife
25 - Active recreation - swimming, boating, fishing
27 - Active and passive recreation and open space
30 - Passive recreation - fishing (gravel pit - needs restoration)
31 - Passive and active recreation - (gravel pit - needs restoration)

D. Beautification

Wilmington has many road intersections, municipal and industrial schools, and historic sites that could be improved in appearance by planting horticultural shrubs and trees. Of particular importance are main roads leading into town such as Massachusetts Routes 38, 62, and 129.

General clean-up drives to improve the appearance of roadsides can be accomplished by civic organizations setting the example and organizing a campaign for this purpose.

The Technical Team felt that a representative group of townspeople could inventory the town to point out some areas for emphasis. To assist in this project a Community Survey Checklist for Beautification is included in this report as Appendix #I.

Consultive assistance on the subject of community beautification is available from the Middlesex County Extension Service, 105 Everett Street, Concord, Mass.

EXPLANATION OF THE NATURAL RESOURCES PROGRAM

This study was compiled by the Natural Resources Technical Team assisting the Middlesex Conservation District.

This study is a portion of Phase I and II of a three phase conservation program for which the Middlesex Conservation District offers assistance.

These phases are:

Phase I - Inventory and Evaluations

This phase consists of:

1. Establishing the town's objectives for the development and use of their natural resources.
2. Preparing a report on soils and their interpretations for various land uses (see published report).
3. Preparation of this report, Natural Resources Study of the Town of Wilmington, Massachusetts.
4. Evaluation of the data presented to the town as part of Phase I studies.
5. Selection of those areas which have potentials that meet the town's objectives.

Phase II - Planning

1. The development of a natural resources plan in which the selections of areas and decisions for natural resource use and development are recorded and implementation of planned use is scheduled.

Phase III - Development

1. Detailed project plans for selected projects.
2. Construction plans and schedules.
3. Operation and maintenance plans for these projects.

CRITERIA USED IN EVALUATING SITES

The following data shows the objectives and the corresponding criteria applied by the Natural Resources Technical Team in the course of the study. The criteria employed consists of certain limitations applied to the sites or areas studied which are based on the minimum physical requirements of the site for the intended use.

Beautification

The site should be visible to the public, and can be of any size or shape. No ready physical access to the site would be necessary. Addition of plant material would increase eye appeal and/or screen an objectionable view, material or man-made hazard. Addition of plant material would reduce erosion by wind and water. The site should have a soil that is well drained, and is at least 2 feet above normal water table.

Boat Access

Areas for boat access will vary according to boat size and type. However, general criteria presume a gradual slope to water, a reasonable vehicle access, sufficient area for parking, and a minimum of soil erosion problems.

Boating

Areas have minimum water depths of five feet during the season of use. The minimum watershed to water surface ratio is 30 to 1 for areas wholly dependent upon surface water supply. Areas have at least one developable site for boat launching and vehicle parking. Boat size, type, and power will depend upon water area.

Camping

Areas are located where topography is relatively level and dry. Access, parking, water supply, and sanitary facilities are feasible to develop. Areas are a minimum of five acres in size, and are often associated with other conservation - recreation uses.

Field Sports

These areas are suitable for various open field activities such as athletics,

horse shows, and fairs. Areas are located on well-drained or moderately well-drained soils and on relatively level topography with access roads available. The ground water level may be near the surface during the winter and early spring, but it recedes during the normal activity season. The soils are capable of supporting a good vegetative cover. The areas are at least 10 acres in size and are readily accessible.

Fishing

Ponds and lakes have a minimum watershed to water surface ratio of 25 to 1 for areas wholly dependent upon surface water supply. Major streams are included where fish can be made available by natural reproduction or on a put-and-take basis. Water quality is such that it is expected to sustain a healthy fish population. Areas have a site suitable for the development of vehicle parking within 1/4 mile of the fishing site and/or reasonable foot access for general public.

Greenbelts

A continuous strip of land valuable for:

1. Connecting areas with natural resource development potentials.
2. Providing access to areas with natural resource development potentials.
3. Acting as a buffer strip to protect and/or screen areas with natural resource values.

Historical

An historical site is one that has received recognition for historical events in history books or other authentic publications.

Nature Study

Areas offer two or more of the following: Water areas, unusual geographic features, glacial features, unusual soil characteristics, and a variety of vegetation and wildlife. The topography allows for the establishment of short interconnecting looped trails for a variety of study experiences.

Picnicking

Areas are dry, easily accessible, aesthetically pleasing and free from uncontrollable features such as noxious plants, odors, and safety hazards. Picnic areas are most often combined with other recreational activities.

Playground

Areas are located on well-drained soils and relatively level topography. The soils are capable of supporting a good vegetative cover. The areas are at least 3 acres in size and readily accessible. These areas are generally located to serve residential developments. It may be located on an elementary school site or as an independent unit. On the average one acre per 800 children may be used for planning purposes. The location is within 1/2 mile of the population it serves.

Skating

Potenital or existing water areas are partially shaded from direct sunlight and protected from heavy winds. The areas have a northern or western exposure and are generally in surface depressions. Where wholly dependent upon surface water supply, the areas have a minimum watershed to water surface ratio of 10 to 1. Excavated type ponds are proposed in areas having a normally high water level. (See Appendix A)

Skiing/Sledding

Potential ski, sled and toboggan areas are protected from prevailing winds and have a northern or western exposure. The soils are suitable for the establishment of vegetative cover. It is also assumed that snow-making equipment will be necessary for full season use, and that a satisfactory water supply exists or can be developed for snow-making.

Swimming

Areas have a minimum watershed to water surface ratio of 30 to 1 for areas wholly dependent upon surface water supply. There are sections or shoreline where the topography and soils are well suited for development of beach and swimming areas. Water supply appears to be clean, silt-free, and protected from future degradation. Water temperature is expected to be 60° or above.

Excavated swimming areas, dependent upon ground water supply, have the same requirements as above except for the watershed to water surface area ratio. There is the additional requirement that the anticipated water recharge be at least 500 gallons per planned swimmer per day. Parking areas can be developed within 800 feet of the beach.

It should be emphasized that the local and state boards of health must be

consulted prior to extensive planning for swimming areas.

Town Forest

Areas are suited to management for forest production. The existing stand of trees is a mixture of good quality hardwoods and softwoods or have potential to establish same. The areas also have potential for multiple-use.. Recreational activities and wildlife consideration are compatible with forest management.

Town Park

Areas selected are primarily landscape parks providing a restful breathing spot. Easy access by motor vehicle and/or foot traffic is available. A variety of trees and shrubs exist or can be planted. Soils are capable of supporting a good vegetative cover. The scenery is attractive and interesting. Picnic facilities, benches, and play apparatus can be provided for patrons. As a neighborhood park, minimum size is 1 acre for each 1000 persons.

Trails

Trail development is considered as needed to facilitate travel through areas which provide experiences in botany, unusual topography and geology, a variety of wildlife, and other natural features of interest. Also considered are trails for general hiking, horseback riding and those with access to existing and potential recreation areas. Trails are included if steepness, drainage, and safety do not impose severe limitations to their development and use.

Vista

Selected vistas have a combination of natural components which create a distinctive and pleasing scene. The vista is normally at a higher elevation than the surrounding topography. The vista may be located at a roadside, or it may be reached by a trail.

Wildlife

Waterfowl management may be implemented in water areas of at least 5 acres and having a minimum watershed to water surface ratio of 10 to 1 for areas wholly dependent upon surface water supply. If areas have a potential water depth of three feet or less over 50 percent of the total expanse, or if such potential

depths can be created by cut or fill operations, then they offer this potential. Soils having a deep organic content covering more than 20 percent of the area will disqualify the site.

Upland wildlife areas are those having sufficient vegetation to encourage a good population of ruffed grouse, cottontail rabbits and gray squirrels, and other indigenous mammals and birds.

GLOSSARY

Conservation District - A political subdivision of the state, usually formed along county lines, governed by an elected Board of Supervisors, with broad natural resources responsibilities.

Natural Resource Potentials - The opportunities which exist to develop the soil, water, plant and fish and wildlife for the perpetuation of these resources.

Natural Resources Technical Team - An organized group of professional employees of different disciplines from State and Federal natural resources agencies.

Operation and Maintenance Plan - A record of the planned use of the projects, including their measures and facilities. It designates responsibilities of various boards for management, use, and prevention of deterioration of the site, measure, and facilities.

Put-and-Take Fishing - Conditions are not suited to natural fish reproduction, so fish must be artificially stocked.

Resource Complex - A generalized area of land having a variety of natural assets and existing on potential uses that distinguishes it in value from other areas.

Scope - The range or extent of the study of various kinds of uses of natural resources.

Town Natural Resources Plan - A record of the town's decisions for the use of its natural resources.

Town Objectives - A set of goals agreed to by the town for the identification, development, and use of natural resources. They are a composite of individual goals assembled by the Conservation Commission consulting with interested town citizens, groups, and town governmental bodies.

Watershed Area - The land which can contribute surface runoff naturally to a given point.

Water Impoundment Sites - The locations where soil and topographic conditions are favorable for the construction of an earthen dam to create a body of water and/or a flood water storage reservoir.

Waterfowl Management Areas- Areas which show potentials for further development of food and cover to attract ducks and geese. This could include planting wildlife foods in the shallow areas, fluctuating water levels to encourage native foods, and establishing islands and other suitable habitat for nesting.

APPENDIX D

OPERATIONAL INTERPRETIVE SOILS REPORT INFORMATION

A comprehensive scientific soil survey report was completed for the town of Wilmington in March 1969.

The U.S.D.A. Soil Conservation Service has performed this survey on a cost sharing basis with Wilmington. A series of maps have been prepared and interpretations made to show the limitations of soils for:

SEPTIC TANK SEWAGE DISPOSAL

COMMERCIAL AND INDUSTRIAL SITES WITH ON-SITE SEWAGE EFFLUENT DISPOSAL

COMMERCIAL AND INDUSTRIAL SITES WITH COMMUNAL SEWER SYSTEM

HOME SITES

WETLAND WILDLIFE SITES

ROADS

WOODLAND

SURFACE RUNOFF

DEPTH TO SEASONAL HIGH WATER TABLE

LAND SLOPE CHARACTERISTICS

INSTALLATION OF WATER AND SEWER PIPELINES

For more information the Middlesex Conservation District should be contacted.

REFERENCES

1. Report of the Water Resources Commission relative to the Public Water Supply Resources of the Ipswich River, January 1965.

2. U.S.D.A. - S.C.S. - Soils and Their Interpretations for Various Land uses. Town of Wilmington, Massachusetts 1969.

3. U.S.G.S. Topo Sheet - Wilmington Quadrangle Base Map Appendix J .

4. Massachusetts Department of Commerce and Development, Monograph Report of Wilmington, Massachusetts. Revised 1969.

APPENDIX F

WATER IMPOUNDMENT SITE STUDY

Water impoundment site data has been compiled in cooperation with the Massachusetts Division of Water Resources, Water Resources Commission, as a portion of a joint reservoir site study.

Six potential sites for impounding surface water were studied. These sites represent only the more obvious locations for impoundment structures from a review of the topographic characteristics of the site allowing for important existing facilities.

Topographic information for this study was taken from the latest available U.S. Geological Survey 7 1/2 minute quadrangle sheets at a scale of 1" - 2000'. The geological information is based on interpretations from Soils and Their Interpretations for Various Land Uses, Town of Wilmington, 1969, U.S.D.A. Soil Conservation Service, and shallow hand auger borings made at each site. Locations of existing facilities were determined from a review of the U.S. Geological Survey Maps and field observations at each site.

It indicates the potential volume of storage and the areas of beneficial pools at the highest selected design elevations. It also indicated a description of each site location, facilities that may be affected, and, based on a very limited reconnaissance of the area, an estimate of the water-holding characteristics expressed as "Good", "Fair" or "Poor". A site classified as "Poor" would indicate a predominance of porous sands and gravels in the abutments and/or pool area, poor foundation conditions for a dam, or a combination of these factors. A "good" site would have no apparent undesirable geologic features.

A more thorough engineering field survey and geological investigation is required prior to final site selection and determination of estimated structure costs.

The criteria used for site selection are as follows:

Minimum contributing watershed area - 100 acres

Minimum beneficial pool area - 5 acres

Minimum depth of water at dam - 3 feet

Minimum watershed area-pool area ratio - 10 to 1

A contributing watershed area relatively free of urban development. All of the selected sites have potentials for excavated type ponds if the dam type pond is not economically or physically feasible. An excavated pond might be suited to skating, wildlife, nature study, swimming or simply beautification.

Six potential sites for impounding surface water were studied during the course of the Natural Resource Study. Information on five of the sites is included in the "Report of the Water Resources Commission relative to the Public Water Supply Resources of the Ipswich River, January 1965".

An engineering reconnaissance was conducted on these sites during 1970. Four of the sites were eliminated due to the build-up of facilities such as houses, roads and utility lines in the beneficial pool area.

The impoundment sites that have been eliminated are 2, 3, 4 and 5. They are located on the Natural Resources Map,Appendix J,Site #1.

WILMINGTON NATURAL RESOURCE STUDY

MERRIMAC RIVER WATERSHED

SITE 1 (ME 1920)

LOCATION: On unnamed brook; approximately 150' upstream from Ballardvale Street and 500' Northeast of intersection of Ballardvale Street and power line.

Wilmington U.S.G.S. Quadrangle
Latitude 42° - 35' - 55" - Longitude 71° - 09' - 42"

SOILS: Waterholding capabilities appear to be good. Soils predominantly silty sands with hard pans. Both abutments appear good. (Soils information taken from Town of Wilmington soil survey).

SUMMARY: Pool area is covered with brush and swamp grass with top of dam at elevation 120, no facilities appear to be affected.

WILMINGTON NATURAL RESOURCE STUDY

IPSWICH RIVER WATERSHED

SITE 2 (I_P-0402)

LOCATION: On unnamed brook, approximately 1500' upstream from Chestnut Street and 3000' downstream from Mill Street in Wilmington.

Wilmington U.S.G.S. quadrangle

Latitude 42° - 31' - 14" Longitude 71° - 10' -43"

SOILS: Waterholding capabilities appear to be good, soils predominantly shallow to bedrock. Both abutments appear good. (Soils information taken from Town of Wilmington soil survey).

SUMMARY: Pool area has a good cover of trees and brush. A section of the Garden of Eden Golf Course will be affected at elevation 120.

Impoundment Number	Drainage Area (acres)	Normal Water Level (Geodetic Elec.)	Depths of Water at Dam (feet)	Pond Area (acres)	Volume of Storage (acre feet)	Top of Dam (Geodetic Elev.)	Height (feet)	Length of dam (feet)
1								
ME 1920	249	112	8	5	14	120	16	900
2								
IP 0402	1095	112	22	11	108	120	30	500
3								
IP 0403								
4								
IP 0401-A	Sites eliminated due to recent construction							
5								
IP 0409								
6								
IP 0401								

Remarks:

1) The above table is based on a field reconnaissance and map study of each site. The values are approximate and show the potential for each site only. Detailed geologic investigations will be necessary to definately determine feasibility of dam sites for water impoundments and the availability of material with which to construct an earthen dam.

2) Locations of dam sites shown on the USGS quadrangle sheets may be moved up or downstream a short distance for geological considerations.

3) Examination of prepared stage-storage-area curves for each site will permit alternate designs. (Located in Soil Conservation Service office).

4) All impoundment sites have the potential to store some flood water. Multiple use of sites is desirable.

APPENDIX G

OPERATION AND RESTORATION STANDARDS FOR GRAVEL PITS

The sand and gravel industry produces raw materials for the building of our factories, highways, homes, schools, airports, and other facilities. As population increases, the demand for this low-cost commodity near expanding cities accelerates. Fortunately, some communities have had foresight and have been able to work out effective and reasonable plans for gravel removal. Others have not been as far-sighted, as a drive through the countryside will indicate.

This appendix is written to provide "general guidelines for gravel operations in any community. Variations and exceptions from these may be in order depending on specific circumstances and community needs and goals.

Gravel operation permits are normally granted sometime after the holding of a public hearing. It should be a standard procedure to require the following information concerning the site with the application for a permit:

1. Existing topography based on a current survey showing five-foot contour intervals. Elevations should be related to USGS data.

2. A log of soil borings taken to the depth of the proposed excavation. The number of borings taken will vary with the size and geological make-up of the site.

Operation Standards

a) No excavation not intended for approved building purposes will be closer than 200 feet to an existing public way unless specifically permitted by the Selectmen; and no excavation will approach neighboring lot lines closer than 50 feet where excavation is not permitted. Natural vegetation shall be left and maintained on the undisturbed land for screening and noise reduction purposes.

b) Operation hours shall be only between 7:00 A.M. and 5:00 P.M. on week days and loaded vehicles shall be suitably covered to prevent dust and contents from spilling and blowing from the load.

c) The active gravel removal operation area shall not exceed a total area of five (5) acres at any one time.

d) All trucking routes and methods will be subject to approval by the Chief of Police.

e) All access roads leading to public ways shall be treated with oil, stone, or other suitable material to reduce dust and mud for a distance of 200 feet back

from said public way.

f) Access roads shall be constructed at an angle to the public way or constructed with a curve so as to help screen the operation from public view.

g) No gravel shall be removed closer to spring high water table that would preclude its subsequent re-use according to existing public health standards. This elevation shall be established from a test pit and the level related to a permanent monument on the property. This information shall show on the topographic plan.

h) During operations, when an excavation is located closer than 200 feet from a residential area or public way and where the excavation will have a depth of more than 15 feet with a slope in excess of 1:1, a fence at least three (3) feet high shall be erected to limit access to this area.

i) No area shall be excavated so as to cause the accumulation of free standing water. Permanent drainage shall be provided as needed in accordance with good conservation practices.

j) All topsoil and subsoil shall be stripped from the operation area and stock-piled for use in restoring the area after the removal operation has ceased.

k) Any temporary shelters or buildings erected on the premises for use by personnel or storage of equipment shall be screened from public view as much as possible. These structures shall be removed from the premises within 30 days after they are no longer needed.

l) The Selectmen or their agents shall be free to inspect the premises at any time.

m) In the cases noted, it seems adequate that no excavation shall be allowed closer than 500 feet from a natural stream.

Restoration Standards

a) No slope shall be left with a slope steeper than 2:1 (50%).

b) All debris, stumps, boulders, etc., shall be removed from the site and disposed of in an approved location, burned at the site, or in the case of inorganic material, buried and covered with a minimum of two (2) feet of soil.

c) Following excavation and as soon as possible thereafter, ground levels and grades shall be established as shown on the completed topographical plan.

d) Retained subsoil and topsoil shall be respread over the disturbed area to a minimum depth of four (4) inches. This soil shall be treated with three (3) tons of lime per acre and 1,000 pounds of 10-10-10 fertilizer per acre and seeded with a grass or legume mixture prescribed by the Middlesex Conservation District. Trees or shrubs may be planted in order to provide screening, natural beauty, and to reduce erosion. The planted area shall be protected

from erosion during the establishment period using good conservation practices.

e) Upon completion of the operation, the land shall be left so that natural storm drainage leaves the property at the original natural drainage points and so that the area of drainage to any one point is not increased.

f) Within six months after termination of gravel operations, all equipment, buildings structures, etc., shall be removed from the premises.

It is suggested that a gravel permit be renewable for a three (3) year period. A new permit would be necessary after each three (3) year period. A performance bond of some amount ($1,000 to $3,000) should be required for each acre on which the permit has been granted. This would be released only after the land has been restored as outlined under that section.

Adoption of regulations is only part of the program. Someone or some agency must be responsible for enforcing compliance with the established rules. Many gravel pit operators will automatically cooperate to everyone's advantage. Some will offer constructive criticism and helpful ideas on how to create a worthwhile tract of land after operations cease. There are numerous instances of swimming ponds, industrial and school sites, and even hay fields that have been established after gravel operations. There are also those cases where almost total disregard of the principles of wise land use have been noted. This is where the alert local authorities are most important.

In some small towns where busy Selectmen are the responsible enforcement agency, review and inspection duties have been given to the conservation commission. Some have town engineers or highway superintendents and police chiefs alert to report compliance or violations. Regardless of who inspects the operations, it is paramount that inspections be thorough and regulations enforced unbiasedly.

TABULAR STUDY OF INVENTORY

TOWN OF WILMINGTON NRS

	A Access	B Boating	C Camping	D Playground	E Trails	F Fishing	G Greenbelt	H Hunting	I Skating	K Sledding	L Field Sports	N Nature Study	O Historical	P Picnicking	S Swimming	T Town Forest	U Beautification	V Vista	W Wildlife
1	X	X				X													X
2			X		X		X			X	X	X		X		X		X	
3			X		X			X		X		X		X		X		X	
4									X										X
5					X											X			
6	X	X			X				X			X							X
7					X	X						X					X		X
8					X	X			X			X							X
9								X				X							X
0											X								
11											X	X							
2				X					X			X							
13									X		X	X							
14				X			X		X		X	X					X		
5				X					X		X	X							X
16						X			X										X
7	X	X				X			X										X
8			X	X	X	X													
19						X			X		X								
0																		X	
21	X	X				X							X						X
2											X	X							

TABULAR STUDY OF INVENTORY

TOWN OF WILMINGTON NRS

	A Access	B Boating	C Camping	D Playground	E Trails	F Fishing	G Greenbelt	H Hunting	I Skating	K Sledding	L Field Sports	N Nature Study	O Historical	P Picnicking	S Swimming	T Town Forest	U Beautification	V Vista	W Wildlife
23			X		X	X	X		X			X							X
24							X												
25	X	X				X			X					X	X				
26				X					X		X	X							
27					X	X			X	X	X		X	X					
28					X						X	X							X
29					X		X			X	X	X	X	X		X	X		
30					X	X			X			X		X			X		X
31							X				X					X	X		

COMMUNITY VISUAL SURVEY

Name of Community _____ County _____

Date _____, 19_____

Name of person or persons making survey _____

_____

_____

Name of Organization _____

Answer the following questions to use in evaluating quality of the physical environment and as resource information for community improvement programs. "No" answers indicate need for changes.

GENERAL	Yes	No
Do highways leading into town create a favorable impression?	___	___
Is the general appearance of the community business area and residential areas clean, neat?	___	___
Would a traveler want to stop here to eat, shop or spend the night?	___	___
Would a stranger be impressed enough to want to live here or establish a business?	___	___

CENTRAL BUSINESS DISTRICT	Yes	No
Are advertising signs aesthetically pleasing?	___	___
Is open space provided for trees, grass, fountain, benches?	___	___
Are sidewalks in good repair and free of weeds?	___	___
Are store fronts attractive?	___	___
Is the business area adequately and attractively lighted?	___	___
Are awnings on store fronts attractive?	___	___
Are railroad tracks and rights-of-ways well maintained?	___	___
Are litter receptacles neat and attractive?	___	___
Is the street furniture attractive?	___	___
Are there adequate, safe parking spaces?	___	___
Does vehicle traffic flow in an efficient, safe manner?	___	___

STREETS		
Do streets have trees?	___	___
Is the street lighting adequate and attractive?	___	___
Are streets free of litter and trash?	___	___
Are vacant lots kept clean?	___	___
Are areas adjacent to streets free from objectionable views (dead trees, trash, dumps, junk cars)?	___	___
Are ditches and drainage areas properly maintained?	___	___
Are street signs attractive?	___	___
Are existing plantings at street intersections safe?	___	___
Are vacant buildings kept in good repair?	___	___

PARKS, PLAYGROUNDS	Yes	No
Is park space sufficient for community needs?	____	____
Are existing parks adequately maintained?	____	____
Are parks easily found by attractive signs?	____	____
Is lighting adequate?	____	____
Are buildings and structures attractive?	____	____
Are rest rooms clean and presentable?	____	____
Is drinking water available?	____	____
Is playground equipment adequate?	____	____
Are playgrounds safe?	____	____
Is litter regularly removed?	____	____
SCENIC AREAS	**Yes**	**No**
Are potential tourist attractions developed?	____	____
Are historical buildings or sites preserved?	____	____
SCHOOLS		
Have school campuses been planned and planted?	____	____
Are existing plantings and lawns in good condition?	____	____
Are school buildings adequately maintained?	____	____
Are litter containers available?	____	____
Is the landscape of the schools a credit and asset to the community?	____	____
Does the maintenance of school grounds set a good example for the children to apply at home?	____	____
CHURCHES AND CEMETERIES	**Yes**	**No**
Are church grounds planted and maintained?	____	____
Are parking lots clearly defined?	____	____
Are cemeteries adequately maintained?	____	____
Are drives and roads attractive and serviceable?	____	____
RESIDENTIAL AREA	**Yes**	**No**
Are houses painted and in good repair?	____	____
Are lawns maintained?		
Do new subdivisions have street trees?	____	____
Do new subdivisions have curbs and gutters?	____	____
Is good landscape design in evidence?	____	____
Is garbage pick-up adequate?	____	____

The best way to begin a community improvement project is to carefully examine existing conditions, both good and bad. Program success depends on good resource information organized into a logical plan. Advice, consultation or plans by a competent landscape architect is the next step toward developing a worthwhile community developing result demonstration. There is no substitute for good basic planning.

This community Visual Survey Form was prepared by Thomas G. Williams, Jr.,Head, Extensi Landscape Department,and Neal Weatherly,Jr.,Special Agent-Landscape Architecture, of the Georgia Cooperative Extension Service for 4-H members to use in a state-wide Beautificatic Program.

NATURAL RESOURCE MAP

TOWN OF WILMINGTON, MIDDLESEX COUNTY, MASSACHUSETTS

LEGEND

- (A) ACCESS
- (B) BOATING
- (C) CAMPING
- (O) PLAYGROUND
- (E) TRAIL
- (F) FISHING
- (G) GREENBELT
- (H) HUNTING
- (I) SKATING
- (K) WINTER SPORTS
- (L) FIELD SPORTS
- (N) NATURE STUDY
- (O) HISTORICAL
- (P) PICNICKING
- (S) SWIMMING
- (T) TOWN FOREST
- (U) BEAUTIFICATION
- (V) VISTA
- (W) WILDLIFE

I●●●● RESOURCE SECTION

(1) RESOURCE COMPLEX

IMPOUNDMENT SITE

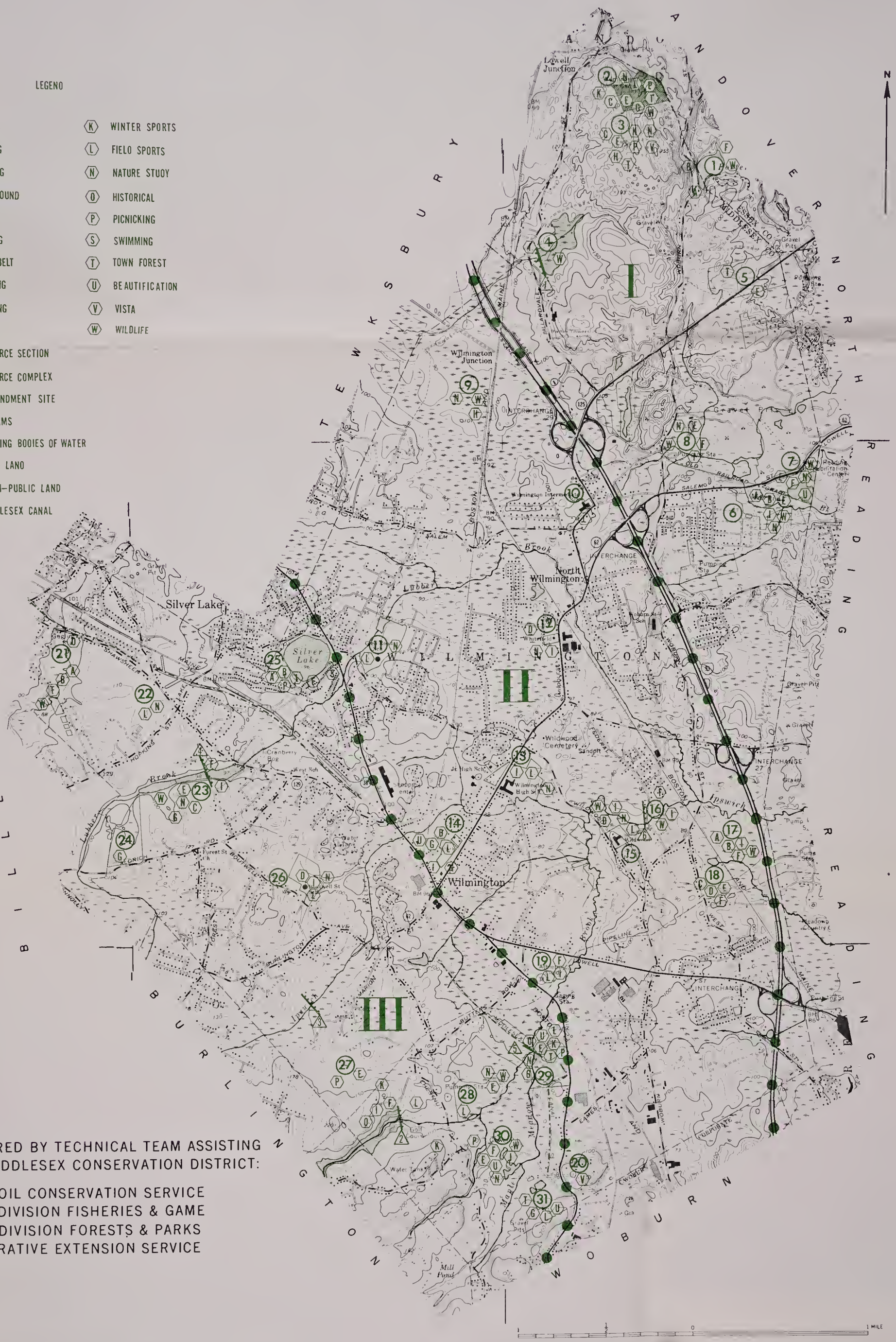
STREAMS

EXISTING BODIES OF WATER

TOWN LAND

QUASI-PUBLIC LAND

MIDDLESEX CANAL



PREPARED BY TECHNICAL TEAM ASSISTING
THE MIDDLESEX CONSERVATION DISTRICT:

U. S. SOIL CONSERVATION SERVICE
MASS. DIVISION FISHERIES & GAME
MASS. DIVISION FORESTS & PARKS
COOPERATIVE EXTENSION SERVICE

MARCH 1970
SOURCE: BASE U.S.G.S. QUAD. SHEET

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